

type of the female of *bouvieri* described and figured. Shelley's description and plate (1877: 227 and pl. 70) of the female of this species agrees with all three specimens, but he himself was not sure that the female type might not be a *bifasciata*. He also mentions under *bouvieri* specimens which are olive above, yellow below, more distinctly striped. Two females collected by W. J. Ansorge at Ndala Tando, 15th and 19th September, 1908, have some slight olive wash on the whole upper side, and are more yellowish below than any others of *bifasciata*, but this seems merely due to their being in very fresh dress. They are the only two specimens showing any such tendency, and in one of them the streaking on the chest is particularly obscure.

Properly placed with other females of *N. chloropygia* Jardine is one collected by Petit at Landana in June, 1876 (B. M. registered number 95.9.9. 44). It bears a Shelley Museum label endorsed "Figured Monogr. Sunbirds" and identified as *Cinnyris bifasciatus*. The supposed female of *bifasciata* figured in Shelley's plate 66 is indeed more olive above and more yellow below than Ansorge's two specimens of *bifasciata*. The black-throated bird also shown on this plate, presumably a young bird, may also not be a *bifasciata*. It is shown as olive on the upper side, but ten black-throated young *bifasciata*, from Cabinda and western Angola, are all brown above, without any sign of olive at all.

Apart from colour distinctions, the female of *chloropygia* is very small, that from Landana and three others from Ndala Tando having wing 48-49, tail 30.5-32, culmen from base 17-18, one 20.5 mm. The female of *N. cuprea* (Shaw) could perhaps be confused at a casual glance with that of *bouvieri* or *bifasciata*, but is mainly distinguished by being practically plain yellowish-olive below, and larger, nine Angolan females thus having wing 55-59 (57.2), tail 37-42 (39.0), culmen from base 19.5-22 (20.7) mm.

It must be made clear that no specimen identifiable with *bouvieri* collected by Petit in Cabinda has been found other than the male type from Cabinda mentioned by Benson & Irwin (*supra*).

Reference:

Shelley, G. E. 1876-80. *A monograph of the Nectariniidae*. London.

The birds of Christmas Island (Indian Ocean)

by A. J. PEARSON

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Physiography

Christmas Island lies in the eastern part of the Indian Ocean in latitude 10° 25' South and longitude 105° 42' East. The island of Java is the nearest land, lying 200 miles to the north, Australia lies 900 miles to the south-east and the Cocos-Keeling islands 600 miles in a direction a little south of west. The submarine slopes of the island are very steep and depths of 1000 fathoms and more are found within two or three miles of the coast.

Geologically the island is a raised coral atoll, the highest point being approximately 1100 feet above sea level. It is roughly T shaped with the T lying on its side and the maximum length is about 13 miles. The total land area is 64 square miles. The land rises in a series of cliffs and terraces to a central plateau. The coastline is formed almost entirely by coral limestone cliffs, varying in height from 15 to 150 feet, which are sheer and undermined, making a landing from the sea virtually impossible. There are a few

small beaches but on only two or three can a boat be got ashore. On the north coast is the only beach of any size, known as Flying Fish Cove, and this is in a semicircular bay which forms the only anchorage.

The phosphate deposits are chiefly on the plateau and second shore terrace. A few trees where Red-footed Boobies and Golden Tropic-birds nested have thus been removed but I doubt whether this has materially affected the birds. Neither does the large increase in the human population in recent years, bringing the total to just over three thousand, seem to have affected the sea birds. All birds on the island are protected by law and this law is enforced strictly.

General

The bird life of Christmas Island can be conveniently divided into—seafowl, resident land birds and migrants.

Several scientific papers have been written about the natural history of the island and the two chief ones are by Andrews (1900) and by Gibson-Hill (1947), the latter based on observations in 1939–40. My own observations are based on two periods of residence on the island together totalling two and a half years between September 1960 and March 1964.

The number of resident species of sea bird has remained constant at nine species since the first records in 1900, and there has been no record of any other migrant or vagrant species of sea bird at the island. This contrasts with the land birds of which nine residents and thirty-eight migrant and vagrant species occur.

SEAFOWL

Sula leucogaster (Boddaert). Brown Booby. This bird is very common; Gibson-Hill estimated approximately 5000 pairs in 1940 and I think this is a fair estimate still. It nests on the ground near the edge of the sea cliff or the first inland cliff though in one or two places nests have been found on flat ground at the head of a coral beach. Nesting occurs all the year round but the most popular months are March to May.

Sula sula rubripes Gould. Red-footed Booby. This species is also very common, particularly on the north and east coasts, and the total population as estimated by Gibson-Hill in 1940 was 5000 pairs which is roughly the same now. Nests are at the top of tall jungle trees on the shore terrace *i.e.* the strip of land 100–400 yards wide between the sea cliff and the first inland cliff. Nesting commences in April and May and the young birds start to fly in October and November. Their plumage is a dull grey-brown, lighter underneath but without the sharply defined line of demarcation present in the Brown Booby.

Sula abbotti Ridgway. Abbott's Booby. One of the least common boobies in the world and certainly the least common on Christmas Island. It is recorded as nesting also on Assumption Island just north of Madagascar (Alexander, 1955, p. 183) but there is some doubt as to the authenticity of this record. Gibson-Hill estimated the number in 1940 as 500–750 pairs. My own impression is that it is now very much less than this, probably only 100 pairs. It nests at the top of tall jungle trees well inland on the plateau at 500–800 feet above sea level. I found only five nesting places and at three of these there was only one nest. It is a noisy bird, bigger than the other two boobies and easily distinguished in flight by its slower wing beat,

narrower wings and apparently longer neck. The nesting sites are inaccessible. Breeding starts in April and May and the young have usually flown by the end of the year.

Anous stolidus (Linnaeus). Common Noddy. Occurs all round the coast, nesting on the sea cliff and in one or two places on trees on the shore terrace. The breeding season is April to September and some birds remain at the island all the year round. Gibson-Hill's estimate of 4000-5000 breeding pairs in 1940 is probably unchanged.

Fregata minor (Gmelin). Great Frigate Bird. This bird is common everywhere. The male is all black, the female has a greyish white throat and breast and a bluish bill. Gibson-Hill estimated the population as 2000-3000 pairs in 1940, but I am unable to make an intelligent guess as to whether the numbers are more or less than this at present.

Fregata andrewsi Mathews. Christmas Island Frigate Bird. I believe Christmas Island is the only known breeding place of this species. Gibson-Hill states that Chasen found it plentiful in the region of the Anamba and Natuna islands in 1925 which suggested that it bred there but no proof of nesting was found. These islands lie between the Malay Peninsula and Borneo, in the South China Sea. It is a large frigate bird with distinctive markings. Gibson-Hill estimated the numbers as 1000-1500 pairs and again I am unable to say whether there are more or less than this at present, though it seems that the numbers of the two species of frigate bird are now about the same. I suspect that it is the Christmas Island species that has increased. Both species of frigate bird nest in tall trees on the shore terrace and the breeding season starts at the end of January and lasts up to ten months.

Phaethon rubricauda Boddaert. Red-tailed Tropic-bird. This bird is common and it nests in open crevices in either the sea, or first inland, cliff, sometimes up to 500 feet above sea level. Nesting begins in May and June and most young have flown by the end of the year. The numbers are estimated at 500 pairs and I don't think this has changed over the past 25 years. I have seen this species at sea 400 miles south of the island.

Phaethon lepturus fulvus Brandt. Golden Tropic-bird. The white-tailed tropic-bird is common in many parts of the tropics but the subspecies *fulvus* seems to be endemic to Christmas Island. I have seen an occasional bird with some yellow colouring at both Ocean Island and Nauru in the Central Pacific but at Christmas Island all are of the apricot-golden colour. Numbers estimated by Gibson-Hill were 300-450 pairs and this has probably remained the same. He also reported them only as nesting in holes in trees but I have found many nests in holes in rocks too. I have seen Golden Tropic-birds at sea 125 miles south of the island.

Demigretta sacra Gmelin. Reef Heron. This is an uncommon bird of the shore and intertidal zone, totalling probably not more than twenty pairs. Both white and grey phases are present. Only two or three nests have ever been found and I have never seen one. The paucity of the nest records is due to the difficult nature of the terrain preventing their being found.

RESIDENT LAND BIRDS

Ducula whartoni Sharpe. Christmas Island Imperial Pigeon. This pigeon is more often heard than seen as it inhabits the topmost branches of the

forest trees on the inland plateau, feeding on the fruits. The call can be imitated easily and this often induces the bird to show itself. It used to be hunted for food and sport and concern for its survival was expressed on a number of occasions between 1900 and 1947, but along with all other birds is now protected and is quite common.

Chalcophaps indica natalis Lister. Christmas Island Emerald Dove. A small brown dove with green wings which inhabits the more open forest floor, both inland and on the shore terrace. In the dry season it often comes into the gardens in the Settlement.

Accipiter fasciatus natalis Lister. Christmas Island Goshawk. In my two and a half years on the island I saw less than ten birds of this species. Gibson-Hill reported it as fairly common over the whole island so its numbers have diminished considerably in the last twenty years. It used to be the only daytime bird of prey of the jungle but sometime between 1940 and 1960 another predator *Falco cenchroides*, Australian or Nankeen Kestrel found its way to the island, and this may have something to do with the decline of the goshawk.

Falco cenchroides Vigors & Horsfield. Australian or Nankeen Kestrel. I first identified this bird on the island in 1960 and it was then present in large numbers. It is an addition to the resident list and was first mentioned in the literature by Voous (1964) and he states that it is an Australian breeding bird, which only rarely migrates outside Australia but that it is known from Java. It is found around the Settlement, the phosphate workings and other cleared areas, and on 25 November 1962, forty kestrels were seen in the course of a ten mile drive across the island.

Ninox forbesi natalis Lister. Christmas Island Hawk Owl. This bird is a nocturnal predator and is widespread throughout the island. Its call sounds like the bark of a small terrier dog some distance away, though the bird may be near at hand.

Collocalia esculenta natalis Lister. Christmas Island Glossy Cave Swiftlet. These birds are present in large numbers everywhere. They nest in the twilight zone of caves, the open cup-shaped nests being fastened to the walls and roof, usually behind some projecting rock or stalactite formation such that the light from the cave entrance does not fall on them. On one occasion I found a swiftlet caught by one strand of a spider's web which stretched between ten feet high telegraph wires and the ground. The strand was wound tightly two or three times round one primary. The bird was hanging limply when found but was uninjured and was released.

Turdus poliocephalus erythropleurus Sharpe. Christmas Island Thrush. One of the commonest birds on the island and very tame. It has a very pleasant song, some phrases resembling *Turdus musicus* and others *Turdus merula*. It also has a delightful subsong, heard most frequently in the heat of the day and sounding similar to the normal song from a bird a hundred yards away, and one would then discover that it was coming from a bird sitting under a bush only a few feet away.

Zosterops natalis Lister. Christmas Island White-eye. Another bird common in all parts. They work through the undergrowth in flocks of up to three dozen. It is considered to be an endemic species by G. F. Mees, Zool. Verhand. Rijksmus. Nat. Hist. Leiden, 35, 1957, pp. 197-200.

Padda oryzivora Linnaeus. Java Sparrow. Liberated on the island in the early part of this century and now established, especially around the area of human habitation.

MIGRANTS

These birds are listed as having been recorded on the island. Most were mentioned by Gibson-Hill (1947). Additions recorded by me are marked with one asterisk and the dates of observation are given. Those mentioned in the paper by Voous (1964) are marked by two asterisks.

Myristicivora bicolor Scopoli. Pied Imperial Pigeon.

Porzana fusca Linnaeus. Malayan Ruddy Crake.

Charadrius apricarius Gmelin. Eastern Golden Plover.

Charadrius leschenaultii Lesson. Large Sand Plover.

Numenius phaeopus Scopoli. Whimbrel.

Capella stenura Bonaparte. Pintail Snipe.

Crocethia alba Pallas. Sanderling.

Erolia ruficollis Pallas. Red-necked Stint.

Erolia minutilla subminuta Middendorff. Long toed Stint.

Tringa totanus eurhinus Oberholser. Eastern Redshank.

Tringa incanans brevipes Vieillot. Grey-rumped Tattler.

Tringa nebularia (Gunnerus). Greenshank.

Tringa glareola Linnaeus. Wood Sandpiper.

Actitis hypoleucos Linnaeus. Common Sandpiper.

****Eupoda asiatica** Pallas. Caspian Plover.

***Limosa lapponica** Linnaeus. Bar-tailed Godwit. Caught and identified 26 October 1963.

Lobibyx miles (Boddaert). Masked Plover (G. F. Mees—unpublished).

****Stiltia isabella** (Vieillot). Australian Pratincole.

Glareola pratincola maldivarum Forster. Collared Pratincole.

Egretta eulophotes Swinhoe. Chinese Egret.

Egretta intermedia plumifera Gould. Plumed Egret.

Egretta garzetta nigripes Temminck. Little Egret.

Notophox novaehollandiae Latham. White faced Heron.

Nycticorax caledonicus hilli Mathews. Nankeen Night Heron.

Butorides striatus amaurensis Schrenck. Little Green Heron.

***Egretta alba alba** Linnaeus. Great White Heron. One bird was present on or around the golf course from 7 April to 5 June, 1962. It was not seen again until 24 January, 1963 and this was killed by a boy on 29 January, 1963. Another single bird was seen on 2 October, 1963.

Anas gibberifrons gibberifrons S. Muller. Wood Teal.

***Falco peregrinus** Tunstall. Peregrine Falcon. One juvenile present from 27 February, to 1 April, 1962.

Chalcites basalis (Horsfield.) Bronze Cuckoo.

Hirundo rustica gutturalis Scopoli. Swallow.

Motacilla cinerea melanope Pallas. Grey Wagtail.

Motacilla flava simillima Hartert. Blue-headed Wagtail.

Anthus campestris striolatus Blyth. Tawny Pipit.

Aethiopsar grandis javanicus Cabanis. Javan Jungle Myna.

Gracula religiosa religiosa Linnaeus. Grackle.

***Eurystomus orientalis** Linnaeus. Broad-billed Roller. One bird was present near the north east coast from 28 January till 2 February, 1963.

**Halcyon chloris* Boddaert. Mangrove Kingfisher. Single birds were seen on the following dates, 8 May, 6 June and 20 September, 1962, and on 26 September, 1963.

**Lanius cristatus* Linnaeus. Brown Shrike. One seen on 7 April, 1962.

References:

- Andrews, C. W. 1900. *A Monograph of Christmas Island*. British Museum.
 Gibson-Hill, C. A. 1947. Notes on the Birds of Christmas Island. *Bulletin of the Raffles Museum*, No. 18: 87-165.
 Alexander, W. B. 1955. *Birds of the Ocean*.
 Voous, K. H. 1964. Notes on a Collection of Birds from Christmas Island. *Nytt Magasin For Zoologi*, Vol. 12: 38-47.

The eggs of the White-tailed Blue Chat, *Cinclidium leucurum*, and the Large Niltava, *Niltava grandis*

by C. J. O. HARRISON and S. A. PARKER

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E. C. Stuart Baker (1933) stated that the eggs of the White-tailed Blue Chat, *Cinclidium leucurum*, and those of the Large Niltava, *Niltava grandis*, were very similar and could only be told apart when compared in series. An examination of the eggs of these species in the collection of the British Museum (Natural History) received from collectors other than Baker revealed that, although the length of the eggs was similar in many cases, the eggs of *C. leucurum* had a breadth range of 15.8-17.7 mm. and were pale with a pink tint, while those of *N. grandis* had a breadth range of 17.5-18.7 mm. and were all distinctly buff in colour (Fig. 1). When the eggs of *N. grandis* in Baker's collection were examined it was found that about half were pale pinkish with a breadth of 16.5-17.5 mm. and the

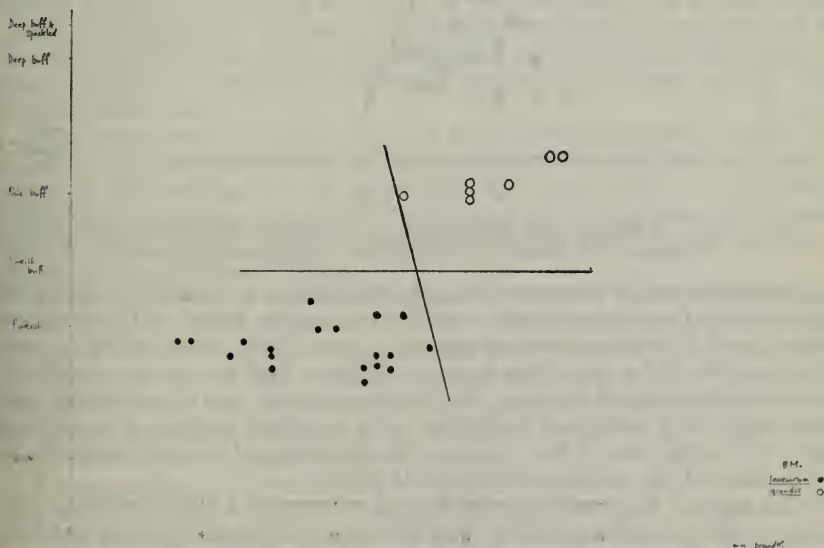


FIG. 1. Known specimens of *C. leucurum* (black spot) and *N. grandis* (open circle). Abscissa = breadth. Co-ordinate = colour.